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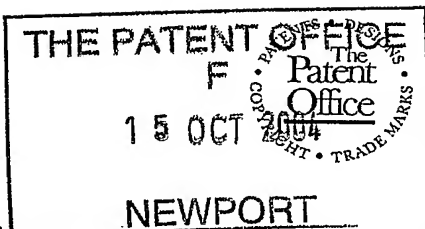
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UNITED KINGDOM

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

7356850002

4. Title of the invention

PUSH BUTTON ASSEMBLY

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

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Country

Priority application number  
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Date of filing  
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

a) any applicant named in part 3 is not an inventor, or

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Patents Form 1/77

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Continuation sheets of this form

Description 11

Claim(s)

Abstract

Drawing(s) 2

10. If you are also filing any of the following, state how many against each item.

Priority documents

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)

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11.

I/We request the grant of a patent on the basis of this application.

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*Wilson*

Date 14/10/04

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Mr. B. Quest - 0161-827-9400

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### PUSH BUTTON ASSEMBLY

The invention relates to push button assemblies and in particular, although not exclusively is concerned with push button assemblies for use in amusement or gaming machines.

5 Conventionally, push button assemblies for amusement or gaming machines comprise a light transmitting button which is manually movable against a spring force to operate an electrical switch and which can be illuminated e.g. by an internal lamp, to attract attention to the button to indicate the current functional status of the associated switch with regard  
10 to the game played with the machine. For example, where the assembly is a start button assembly the button may be illuminated with a steady or flashing light to indicate that the button can be pressed to initiate game play, the button otherwise being non-illuminated or differently illuminated.

GB 2350722 provides a push button assembly with which the  
15 button is surrounded by an external bezel that has an array of illuminable LEDs beneath it. Light is transmitted by light conducting elements to the bezel to provide a display of light spots which can twinkle or alternate to give an attractive changing pattern.

An object of the present invention is to provide a more varied  
20 illumination arrangement for a push button assembly to facilitate a greater versatility of uses for the assembly.

According to the invention therefore there is provided a push button assembly comprising an electrical switch, a light transmitting

button movable to operate the switch and a first illumination means for illuminating the button, characterised in that a second illumination means is provided for illuminating a boundary at least partially around the button, wherein the first and second illumination means are controllable  
5 separately.

With this arrangement, the boundary and the button can be illuminated on different occasions, in different combinations or kinds of illumination such as steady illumination, flashing illumination, different colours of illumination, different extents of illumination around the  
10 boundary, and so on. The different illumination arrangements can be used to facilitate greater versatility of use of the push button assembly, for example by indicating different operational statuses for the electrical switch which may be related to different stages or events for use of the switch, for example different stages or events in a game played with an  
15 amusement or gaming machine indicated or controlled by the switch.

The first and second illumination means may comprise separate illumination sources which are operable separately. Alternatively there may be a common source with separately controllable illumination links between the source and the button and the boundary thereby to provide  
20 the separately controllable illumination means.

The illuminable boundary may extend partially or wholly around the button in one or a plurality of independently illuminable segments. In a particularly preferred embodiment the boundary is illuminable as a single

segment which extends in a closed or substantially closed track around the button, thereby defining a 'halo' ring around the button. The boundary may be curved or angular and thus may be circular or rectangular or of any other shape.

5       The (or each) segment of the boundary is preferably such as to provide an elongate visually continuous light path which may be of the form of a narrow line or strip. This may be achieved by using a continuous light source or multiple light sources located closely adjacent to each other to give the effect of continuous light or one or more light  
10       sources with a light distributing or confining device such as a lens or diffuser or filter or the like which spreads or deflects or confines the light along a continuous path.

      The assembly may comprise a housing on which the first and second illumination means, the light transmitting button and the switch  
15       are mounted.

      The housing may comprise a hollow tubular body such as a cylindrical body open at opposite ends.

      An actuating structure may be movably mounted within the housing for transmitting movement of the button to the switch for  
20       operating thereof.

      A spring means may be provided in the housing for spring loading the actuating structure.

      The switch may be mounted beneath an open bottom end of the



housing and the actuating structure may have a foot which projects beyond the bottom end for operable engagement with the switch.

The button may comprise a cap which projects beyond an open top end of the housing and is movable within limits into and out of the  
5 housing.

The first illumination means may comprise a lamp, such as a filament lamp or LED which may be mounted within the housing. Suitably the lamp may be attached to the switch to form a unit therewith which is detachably engageable with the housing.

10 The housing preferably has a peripheral flange e.g. around the aforesaid open top end of the housing to define a bezel around the button.

The second illumination means is preferably located within a peripheral part separate from the flange, preferably beneath the flange, to  
15 produce the boundary illumination through such part which is thereby appropriately light transmitting. In this case the flange need not be light transmitting, and may be opaque thereby to define a non-illuminable boundary between the button and the illuminable boundary.

The flange and the aforesaid peripheral part may be of any suitable  
20 shape and thus may be generally ring shaped of circular or square or rectangular conformation and may be the same as or different from the cross-sectional shape of the aforesaid tubular body of the housing.

Preferably the second illumination means may use an

electroluminescent film or wire which contacts a circuitry which passes a current through the film or wire resulting in a glow being emitted. The electroluminescent film or wire may be enclosed within or embedded in the aforesaid peripheral part. Alternatively the film or wire may be  
5 located in a groove provided around the periphery of the flange or the peripheral part. In a particularly preferred embodiment a single electroluminescent wire is used to provide a continuous closed loop illumination path.

Alternatively, other light sources or combinations of sources may  
10 be used for the second illumination means.

The second illumination means may emit white or coloured light when energised and may be arranged to emit a single coloured or multi-coloured line of light to the boundary.

The push button assembly may have separate electrical  
15 connections or terminals for the two illumination means so that they may be controlled separately from one another.

In use these separate connections and terminals may be connected to operating circuitry of an amusement or gaming machine so that they are activated in different ways on different occasions in correspondence  
20 with different game play stages or features.

When used with an amusement or gaming machine the push button assembly may be mounted on a panel of the machine by insertion of the aforementioned housing through an aperture in the panel so that the

aforementioned flange and the push button are on the outer side of the panel. A suitable attachment means may be applied to the housing to fix this relative to the panel, e.g. a threaded nut engaged with a threaded portion of the housing.

5           The invention will now be described further by way of example only and with reference to the accompanying drawings in which:

Figure 1       is a perspective view of part of a push button assembly according to one embodiment of the invention for use with an amusement or gaming machine;

10   Figure 2       is a plan view of the arrangement of figure 1;

Figure 3       is a diagrammatic side view of the arrangement of figure 1; and

Figure 4       is an exploded diagrammatic view of the push button assembly.

15           As shown in figure 4 a push button assembly comprises a light-transmitting button 1, a first illumination means 15, a second illumination means 19, a housing 2, an electrical switch unit 4 and a switch actuating structure.

          The housing 2 comprises a hollow cylindrical body 11 with an  
20   external screw thread and an integral outwardly projecting flange 10 around a top end of the body 11. The flange 10 has an inclined or curved outer face and is tapered upwardly. The body 11 is of circular cross section but the flange 10 is generally square and bounds a square top

opening of the housing 2. The flange 10 has a flat under face 27 which extends radially outwardly from the body. Beneath the flange there is a peripheral annular part 18 which is of cross-sectional shape and size essentially the same as the shape and size of the flat face 27 of the flange. The part 18 is therefore generally square and has generally flat upright outer side walls although these may be slightly inclined to taper upwardly. The part 18 thereby defines a skirt beneath the flange 10 and the part 18 may be formed integrally with or separate to the flange 10. If separate the part 18 may be attached or keyed to the flange 10. The flange 10 is opaque and the part 18 is transparent or translucent. An electroluminescent wire 19 defining the aforesaid second illumination means is embedded in the part 18 as described hereinafter. A downwardly projecting locating pin 12 is attached beneath the part 18 on a radially extending flat bottom face thereof, although this is optional.

15       The light-transmitting button 1 comprises a square flat cover plate 7, a square upwardly slightly domed cap 9 and an intermediate printed and/or coloured insert 8. These parts of the button 1 fit within the opening of the flange 10 with the cap 9 projecting slightly above the flange 10 such that the button 1 is held captive relative to the flange 10 but can move upwardly and downwardly to a limited effect.

20       The switch actuating structure is held captive within the cylindrical body beneath the button 1 and comprises a cylindrical stem 5 provided with two spring legs 6 with outwardly turned feet 6a which fit beneath

the bottom rim of the housing body and hold the stem 5 in place in the housing 2 against the action of a spring 3 which is located within the stem 5 and engages the stem at its upper end and an abutment within the body of the housing 2 at its lower end.

5        The first illumination means and the electrical switch 16 are provided by an integrated lamp-switch unit 4. In the lamp-switch unit 4, the electrical switch 16 is a microswitch having a generally rectangular body with an upwardly projecting operating member at one end of its top face and the illumination means is in the form of a lamp 15, which  
10 projects upwardly and is mounted on top of the body of the microswitch. The unit fits into the bottom end of the housing 2 and is held in position by means of pins 14 engageable with a locating hole in the body 11 such that the lamp 15 projects axially within the housing body and within the stem 5 and spring 3 and one of the feet 6a of the actuating structure is  
15 aligned with the operating member of the microswitch 16 which is located wholly externally of the housing body. Connection terminals for the lamp and the switch depend from the unit externally of the housing body.

      The flange 10 is made from an opaque plastics material and defines  
20 a non-illuminable bezel around the button.

      The second illumination means is provided by the electroluminescent wire 19 which is embedded around the internal periphery of the light transmitting part 18. The ends of the said wire pass

through the body 11 for connection to circuitry (not shown).

In an alternative arrangement shown in broken lines on figure 4 the electroluminescent wire 19a is mounted around the outer periphery of the part 18, e.g. in a peripheral groove, so as to project free of the part 18, although if desired a cover part may be provided for the wire.

In use, the housing body is inserted through a circular aperture in a panel of an amusement or the gaming machine, which may be a glass, metal, plastics or other panel, with the flange 10, part 18 and button 1 on the outer side of the panel. If provided, the pin 12 engages with a hole in the panel for location purposes. The ends of the electroluminescent wire 19, 19a can pass through the housing body 11.

The two illumination means and the switch are connected to the operating circuitry of the amusement or gaming machine.

At appropriate stages in the game played with the machine the button assembly is operable to initiate or control a machine function. In this case, the button can be pressed by a player whereby the button is depressed, the stem of the actuating structure is slid axially downwardly against the pressure of the spring and one of the feet engages the operating member of the microswitch to operate the switch and supply an electrical signal to the machine operating circuitry.

In conventional manner, the button can be illuminated with a steady or flashing light to indicate that the assembly is available for operation, by supply of power to the lamp which is located immediately

below the light transmitting cover.

Also on appropriate occasions power can be supplied to the electroluminescent wire 19, 19a to cause it to be illuminated. Illumination of the wire causes a 'halo' ring of light to be produced in a closed-loop square boundary around the button. The light extends in a narrow strip or line shaped path.

This 'halo' ring is defined as a consequence of the positioning shape and characteristics of the wire in conjunction with the positioning, shape and characteristics of the part 18.

10 The 'halo' ring is controllable separately from the illumination of the button and this gives a range of indication possibilities. The opaque flange 10 defines a non-illuminated boundary between the button and the 'halo'.

Thus the button may be illuminated when it can be used to indicate or control one machine function or game feature and the 'halo' ring may be illuminated when the button can be used to indicate or control a different machine function or game feature.

20 The button illumination may be constant or flashing. The 'halo' illumination may also be constant or flashing and may be of different colours whereby there is a wide range of illumination combinations which can be used to give a wide range of game play indications.

It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiment, which is

described by way of example only. Thus for, example, instead of using electroluminescent wire, there may be a continuous strip or line shaped source for the second illumination means which may be an electroluminescent film or provided by a close arrangement of LED's on a  
5 circuit board or the like, subject to the appropriate construction and arrangement of the source or sources to define a boundary path of light.





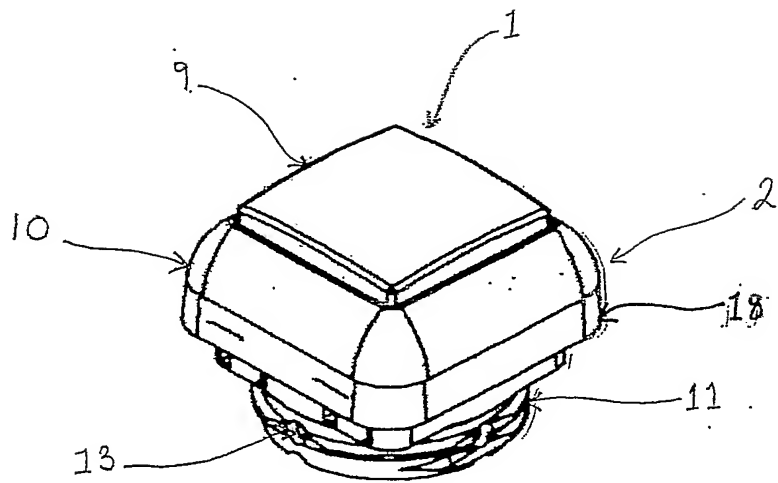


Fig. 1.

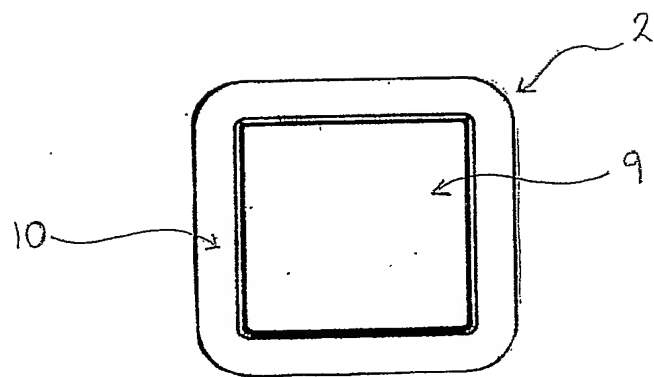


Fig. 2.

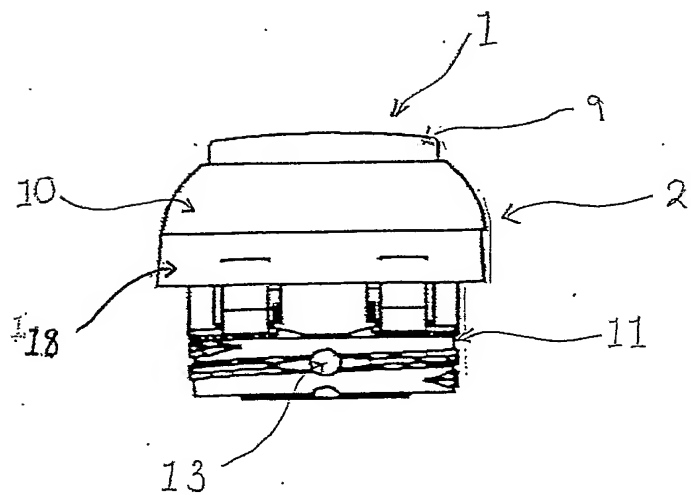


Fig. 3.



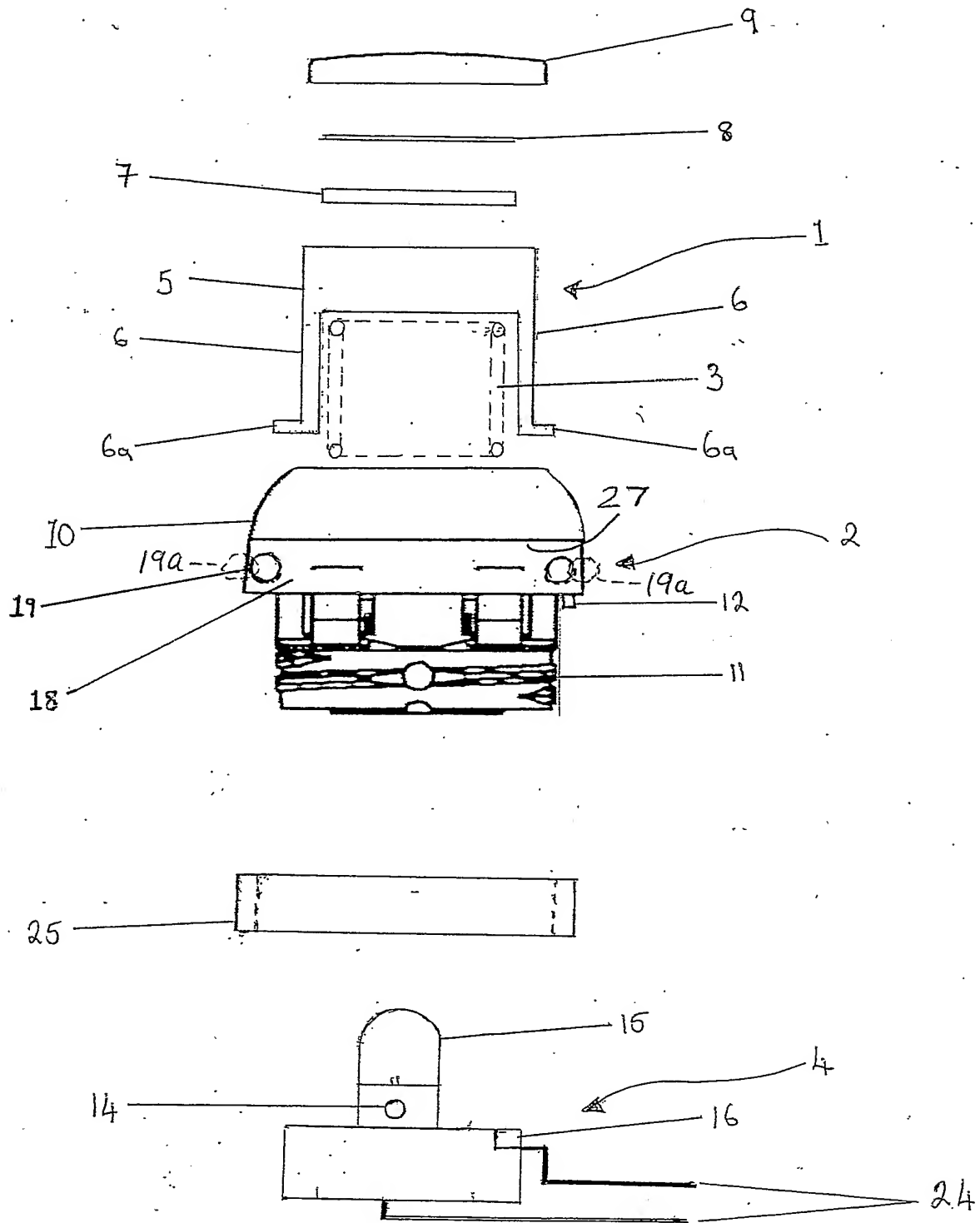


FIG. 4

